

REMARKS

In the Office Action, the Examiner rejected claims 1-2, 4-5, 7-9, 11-12, 14-16, 19 and 21 under 35 U.S.C. § 103(a) as being unpatentable over Rice et al. (U.S. Pat. No. 6,188,203) in view of Yamaguchi (Japanese patent document no. 404000907), Mori et al. (U.S. Pat. No. 5,262,711) and Microelectronic Circuits by Sedra/Smith. The Examiner further rejected claims 6 and 20 under 35 U.S.C. § 103(a) as being unpatentable in view of the above references in combination with Denaci (U.S. Pat. No. 5,844,383), and rejected claims 3 and 18 under 35 U.S.C. § 103(a) as being unpatentable in view of the above references and further in view of ordinary skill in the art.

The Applicants appreciate the Examiner's indication that pending claims 10, 13 and 17 would be allowable if rewritten in independent form.

In response to the Office Action, the Applicants provide the following comments.

Amendments to Claims 11-13 and 22

In response to the Examiner's indication that pending claim 13 would be allowable if rewritten in independent form, the Applicants have amended claims 12-13 and added new claim 22. The Applicants respectfully submit that amended claims 12-13 and 22 are now in condition for allowance.

Specifically, the Applicants have amended claim 13 to expressly recite all of the limitations of claim 11. This amendment does not add new matter and was not made for reasons substantially related to the patentability of the claim, since the limitations of claim 11 were already included within claim 13 prior to the amendment.

Given this amendment to claim 13, the Applicants have correspondingly canceled original claim 11, without prejudice, and also have amended claim 12 to depend from claim 13 rather than claim 11. These amendments also do not add new matter.

Page 5

Additionally, the Applicants have made an additional minor change to the language of claim 13, to provide that the processing means causes the modification means to step up the gain of the amplification means "when the current measurement value falls below at least one of the first threshold and a second threshold" rather than simply "when the current measurement falls below the first threshold". This amendment has not been made for reasons substantially relating to the patentability of the claim, but rather simply to clarify that the threshold at which the gain is stepped up need not be identical to the threshold at which the gain is stepped down. The amendment does not add new matter (and is supported by, for example, the language of pending claims 1 and 14), but rather simply reflects the possibility of hysteresis in the control of the amplification means.

Also, new claim 22 has been added merely to reemphasize the possibility (but not the requirement) that the first and second thresholds are identical.

REJECTIONS OF CLAIMS 1-9 UNDER 35 U.S.C. § 103(a)

Despite the Examiner's comments in the Office Action, and the Examiner's identification of (for the first time in this Office Action) Mori et al., the Applicants respectfully submit that the Examiner still has not provided references that show the Applicants' invention as recited in independent claim 1 or that provide a suggestion to combine or modify the references in such a manner as to arrive at the Applicants' invention.

The Applicants recognize that Yamaguchi shows an operational amplifier circuit that includes three resistors and a switch that are coupled in the same configuration as those recited in pending claim 1. Further, the Applicants recognize that both Rice et al. and Mori et al. show alternators coupled to electrical circuits that employ an operational amplifier and resistors.

Nevertheless, the Applicants maintain that nowhere, in any of these references, is there any suggestion to combine

Page 6

these various teachings to arrive at the Applicants' invention. In particular, there is no suggestion in any of the references that it would be useful or desirable to sense alternator current by way of an amplifier having a switchable gain. Nor is there any suggestion in any of the references to control the switchable gain by way of a processor based upon the sensed alternator current output provided by the amplifier.

While the Examiner has for the first time also relied upon Mori et al. in his rejection, the Applicants respectfully submit that the addition of Mori et al. is insufficient to demonstrate that the Applicants' invention is obvious. In fact, the Applicants are confused by the Examiner's reliance upon Mori et al. While Mori et al. does show an alternator having a current that is controlled by current control circuit 16, this is irrelevant to the Applicants' invention. The processor as claimed in the Applicants' invention operates to control the gain of a differential amplifier that is providing its output to the processor. In contrast, the controller of Mori et al. operates to control the alternator field current, something which is not a part of Applicants' claimed invention.

Further, Mori et al. (e.g., in Fig. 2) still does not show any control of the gain of a differential amplifier. Rather, the current control circuit of Mori et al. produces a triangular wave that in turn is used to output a pulse train to control the field current (see col. 5, lines 1-11).

Thus, the Applicants respectfully submit that the references cited by the Examiner still do not show "a processor coupled to the output [of an operational amplifier] and being operable, based upon a current indication related to the level of alternator current indicated at the output, to control the operation of the switching element", as is recited in pending claim 1.

Further, the Applicants submit that the cited references fail to provide any suggestion or modification to combine and modify the references to arrive at the Applicants' invention.

Page 7

Why should the particular circuit of Yamaguchi be employed with respect to any of the other circuits of the other references in connection with an alternator to assist in sensing alternator current? Why should any of the references be combined to provide for variable-gain sensing of alternator currents? Why should any control device disclosed in Rice et al. or Mori et al. be combined with the circuit of Yamaguchi to allow for variable-gain sensing of alternator currents?

The Applicants respectfully submit that, in order for the pending claim 1 to be found obvious in view of the cited references, the Examiner must demonstrate that the references provide answers to these questions. As stated by the Federal Circuit in Cornell v. Sears, Roebuck and Co., 220 USPQ 193, 199 (1983):

It is not "features" but the subject matter of the invention "as a whole" that must be considered, 35 USC 103. That features, even distinguishing features are "disclosed" in the prior art is alone insufficient. As above indicated, it is common to find elements or features somewhere in the prior art. Moreover, most if not all elements perform their ordained and expected function. The test is whether the claimed invention, as a whole, in light of all the teachings of the references in their entireties, would have been obvious to one of ordinary skill in the art at the time the invention was made.

Further, the Federal Circuit stated in In re Geiger, 2 USPQ 2d 1276, 1278 (1987):

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some suggestion or incentive supporting the combination.

The Applicants respectfully request that the Examiner reconsider his perspective on the obviousness of pending claim 1 (and claims 2-9 as well) in view of these pronouncements by the Federal Circuit.

Page 8

**REJECTIONS OF CLAIMS 14-21 UNDER 35 U.S.C. § 103(a) and
RELATED AMENDMENT OF CLAIM 14**

The Applicants also respectfully traverse the Examiner's rejection of independent claim 14 and the claims depending from claim 14 (aside from claim 17). The Applicants are unable to find within the references the "providing [of] a processor in communication with a switching element of [a] differential amplifier and [an] output port [of that differential amplifier]". Nor are the Applicants able to find any disclosure within the references of the switching of a status of a switching element of a differential amplifier based upon measured current values so as to modify the gain of the differential amplifier.

Again, the Applicants do not understand the relevance of Mori et al. The Applicants are not claiming that a controller/processor controls the field current of an alternator. Rather, the Applicants are claiming that a processor receives an indication of sensed alternator current and, based upon that indication, controls the gain of the amplifier that is providing the indication to the processor.

To clarify this point, and further clarify the irrelevance of Mori et al., the Applicants have made a minor amendment to claim 14. This amendment merely further reiterates that it is the processor that receives the current indications from the amplifier that in turn switches the amplification of that amplifier. That is, the processor receives the alternator current measurements that are output by the amplifier and, based upon those measurements, controls the gain of the amplifier. This amendment does not add new matter and is not being made for reasons substantially related to the patentability of the claim, since the claim limitation is only being added to clarify the claim and is redundant in view of the original limitations of the claim.

Additionally, the Applicants are unable to find within the cited references any suggestion to combine and modify the references to arrive at the Applicants' invention as recited in claim 14. As discussed above, such a suggestion or teaching is required in order to show obviousness of the present invention.

Page 9

For at least these reasons, therefore, the Applicants respectfully submit that each of the pending independent claims 1, 14 and 13 (as amended) and their corresponding dependent claims (as amended) are allowable over the cited references.

* * *

Conclusion

In view of the Remarks and Amendments being submitted herewith, the Applicants respectfully request reconsideration and allowance of the present application.

The Applicants wish to invite the Examiner to telephone the Applicants' attorney at the number listed below if discussion with the Applicants' attorney would be of assistance to the Examiner or further the prosecution of the present application.

Respectfully submitted,
David A. Hintz et al.

Dated: January 29, 2003

By: 

John T. Pienkos
Reg. No. 42,997
QUARLES & BRADY
411 East Wisconsin Avenue
Milwaukee WI 53202-4497
(414) 277-5777

VERSION SHOWING CHANGES TO CLAIMS

12. (Amended) The system of claim [11] 13, further comprising a current transformation means for receiving a fourth signal indicative of the current level within the alternator from the alternator and providing the first signal in response thereto.

13. (Amended) [The system of claim 11,] A system for accurately sensing current levels within an alternator, the system comprising:

an amplification means for amplifying or reducing a first signal indicative of a current level within the alternator to produce a second signal indicative of the current level;
a modification means for adjusting the level of amplification or reduction of the amplification means; and
a processing means for controlling the modification means based upon at least one of the second signal and a third signal based upon the second signal, and for processing at least one of the second signal and the third signal to determine a current measurement value;

wherein the processing means causes the modification means to step down a gain of the amplification means when the current measurement value exceeds a first threshold, and the processing means causes the modification means to step up the gain of the amplification means when the current measurement value falls below at least one of the first threshold and a second threshold.

14. (Amended) A method of accurately sensing current levels within an alternator, the method comprising:

providing a differential amplifier configured to receive a first indication of a current level within the alternator at a first input port and to provide a second indication of the current level at an output port;

providing a processor in communication with a switching element of the differential amplifier and the output port;

receiving the first indication of the current level;

Page 11

determining at the processor at least two measured current values based upon the second indication;

switching a status of the switching element to reduce a gain of the differential amplifier when the measured current values increase from being below a first threshold to exceed the first threshold; and

switching the status of the switching element to increase the gain of the differential amplifier when the measured current values fall from above a second threshold to below the second threshold;

wherein the switching of the status of the switching element is caused by the processor based upon the measured current values.